

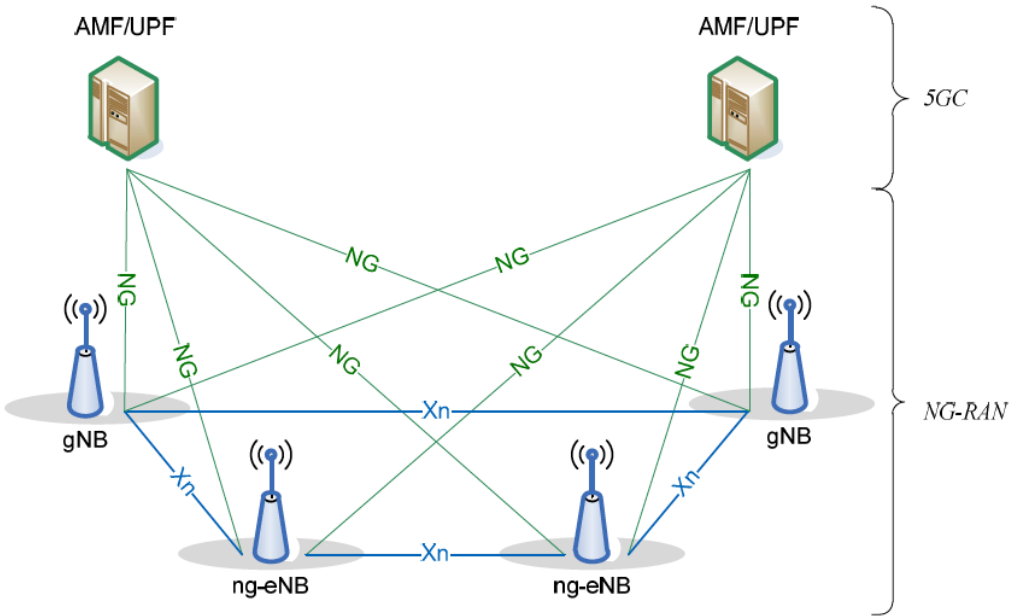
# Exhibit 7

**Exhibit 7 - U.S. Patent No. 10,368,361 (“361 Patent”)**

Accused Instrumentalities: cellular base stations that support 3GPP NG-RAN supporting directional Supplementary Uplink (SUL) functionality, and all versions and variations thereof since the issuance of the asserted patent.

**Claim 10**

Claim 10	Public Documentation
<p>[10pre] A wireless base station for a wireless communication network, the wireless base station comprising:</p>	<p>To the extent the preamble is found to be limiting, the Accused Instrumentalities comprise a wireless base station for a wireless communication network.</p> <p>For example, the Accused Instrumentalities include an NG-RAN node, such as a gNB, which performs wireless communication in accordance with NG-RAN architecture. This structure is described, for example, in 3GPP standards documents such as TS 38.104 v15.5.0, TS 38.101-1 v15.5.0, TS 38.300 V2.0.0, and associated documents, which describe aspects of the operations associated with components of the Accused Instrumentalities.</p> <h3>4.1 Overall Architecture</h3> <p>An NG-RAN node is either:</p> <ul style="list-style-type: none"> <li>- a gNB, providing NR user plane and control plane protocol terminations towards the UE; or</li> <li>- an ng-eNB, providing E-UTRA user plane and control plane protocol terminations towards the UE.</li> </ul> <p>The gNBs and ng-eNBs are interconnected with each other by means of the Xn interface. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the AMF (Access and Mobility Management Function) by means of the NG-C interface and to the UPF (User Plane Function) by means of the NG-U interface (see TS 23.501 [3]).</p> <p>NOTE: The architecture and the F1 interface for a functional split are defined in TS 38.401 [4].</p>

Claim 10	Public Documentation
	<p>The NG-RAN architecture is illustrated in Figure 4.1-1 below.</p>  <p style="text-align: center;"><b>Figure 4.1-1: Overall Architecture</b></p> <p>(3GPP TS 38.300 v17.2.0, § 4.1)</p>
<p>[10a] a quality status module configured to determine a respective quality status of a first frequency spectrum resource and a second frequency spectrum resource, wherein each of the first frequency spectrum resource and the second frequency spectrum resource are associated with an air interface that is available for use by the wireless base station for an uplink channel or a downlink channel;</p>	<p>The Accused Instrumentalities comprise a quality status module configured to determine a respective quality status of a first frequency spectrum resource and a second frequency spectrum resource, wherein each of the first frequency spectrum resource and the second frequency spectrum resource are associated with an air interface that is available for use by the wireless base station for an uplink channel or a downlink channel.</p> <p>For example, the Accused Instrumentalities include a particular hardware or software module to perform radio resource management and related functions, including respective quality determinations for each frequency resource within the NR air interface used by the base station for uplink and/or downlink.</p>

Claim 10	Public Documentation
	<p><b>4.2 Functional Split</b></p> <p>The <del>gNB</del> and ng-eNB host the following functions:</p> <ul style="list-style-type: none"> <li>- <u>Functions for Radio Resource Management: Radio Bearer Control, Radio Admission Control, Connection Mobility Control, Dynamic allocation of resources to UEs in both uplink and downlink (scheduling);</u></li> <li>- IP header compression, encryption and integrity protection of data;</li> <li>- Selection of an AMF at UE attachment when no routing to an AMF can be determined from the information provided by the UE;</li> <li>- Routing of User Plane data towards UPF(s);</li> <li>- Routing of Control Plane information towards AMF;</li> <li>- Connection setup and release;</li> <li>- Scheduling and transmission of paging messages;</li> <li>- Scheduling and transmission of system broadcast information (originated from the AMF or OAM);</li> <li>- <u>Measurement and measurement reporting configuration for mobility and scheduling;</u></li> <li>- Transport level packet marking in the uplink;</li> <li>- Session Management;</li> <li>- Support of Network Slicing;</li> <li>- QoS Flow management and mapping to data radio bearers;</li> <li>- Support of UEs in RRC_INACTIVE state;</li> <li>- Distribution function for NAS messages;</li> <li>- Radio access network sharing;</li> <li>- <u>Dual Connectivity;</u></li> <li>- Tight interworking between NR and E-UTRA.</li> </ul> <p>(3GPP TS 38.300 V2.0.0 (2017-12), § 4.2)</p> <p style="text-align: right;"><i>References:</i></p>

Claim 10

Public Documentation



**Table 5.2-1: NR operating bands in FR1**

NR operating band	Uplink (UL) operating band BS receive / UE transmit <i>F<sub>UL,low</sub></i> – <i>F<sub>UL,high</sub></i>	Downlink (DL) operating band BS transmit / UE receive <i>F<sub>DL,low</sub></i> – <i>F<sub>DL,high</sub></i>	Duplex Mode
n1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
n2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
n3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
n5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
n7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
n8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
n12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
n20	832 MHz – 862 MHz	791 MHz – 821 MHz	FDD
n25	1850 MHz – 1915 MHz	1930 MHz – 1995 MHz	FDD
n28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
n34	2010 MHz – 2025 MHz	2010 MHz – 2025 MHz	TDD
n38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	TDD
n39	1880 MHz – 1920 MHz	1880 MHz – 1920 MHz	TDD
n40	2300 MHz – 2400 MHz	2300 MHz – 2400 MHz	TDD
n41	2496 MHz – 2690 MHz	2496 MHz – 2690 MHz	TDD
n50	1432 MHz – 1517 MHz	1432 MHz – 1517 MHz	TDD
n51	1427 MHz – 1432 MHz	1427 MHz – 1432 MHz	TDD
n65	1920 MHz – 2010 MHz	2110 MHz – 2200 MHz	FDD
n66	1710 MHz – 1780 MHz	2110 MHz – 2200 MHz	FDD
n70	1695 MHz – 1710 MHz	1995 MHz – 2020 MHz	FDD
n71	663 MHz – 698 MHz	617 MHz – 652 MHz	FDD
n74	1427 MHz – 1470 MHz	1475 MHz – 1518 MHz	FDD
n75	N/A	1432 MHz – 1517 MHz	SDL
n76	N/A	1427 MHz – 1432 MHz	SDL
n77	3300 MHz – 4200 MHz	3300 MHz – 4200 MHz	TDD
n78	3300 MHz – 3800 MHz	3300 MHz – 3800 MHz	TDD
n79	4400 MHz – 5000 MHz	4400 MHz – 5000 MHz	TDD
n80	1710 MHz – 1785 MHz	N/A	SUL
n81	880 MHz – 915 MHz	N/A	SUL
n82	832 MHz – 862 MHz	N/A	SUL
n83	703 MHz – 748 MHz	N/A	SUL
n84	1920 MHz – 1980 MHz	N/A	SUL
n86	1710 MHz – 1780 MHz	N/A	SUL

(3GPP TS 38.104 V15.5.0 (2019-03), Table 5.2-1).

In the example highlighted above, a non-limiting first frequency spectrum resource is the Supplementary UpLink (SUL) band 80, and a non-limiting second frequency spectrum resource is the bi-directional TDD band 78.

Claim 10

Public Documentation

## 5.1 General

The channel arrangements presented in this clause are based on the *operating bands* and *BS channel bandwidths* defined in the present release of specifications.

NOTE: Other *operating bands* and *BS channel bandwidths* may be considered in future releases.

Requirements throughout the RF specifications are in many cases defined separately for different frequency ranges (FR). The frequency ranges in which NR can operate according to the present version of the specification are identified as described in table 5.1-1.

**Table 5.1-1: Definition of frequency ranges**

Frequency range designation	Corresponding frequency range
FR1	410 MHz – 7125 MHz
FR2	24250 MHz – 52600 MHz

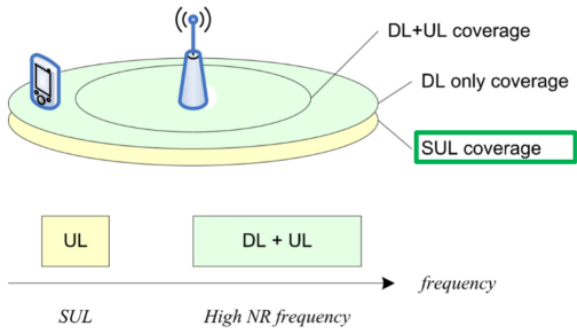
(3GPP TS 38.104 V15.5.0 (2019-03), § 5.1 and Table 5.1)

**Table 5.2C-1: Operating band combination for SUL in FR1**

NR Band combination for SUL	NR Band (Table 5.2-1)
SUL_n78-n80 <sup>2</sup>	n78, n80
SUL_n78-n81 <sup>2</sup>	n78, n81
SUL_n78-n82 <sup>2</sup>	n78, n82
SUL_n78-n83 <sup>2</sup>	n78, n83
SUL_n78-n84 <sup>2</sup>	n78, n84
SUL_n78-n86 <sup>2</sup>	n78, n86
SUL_n79-n80 <sup>2</sup>	n79, n80
SUL_n79-n81 <sup>2</sup>	n79, n81
NOTE 1: If a UE is configured with both NR UL and NR SUL carriers in a cell, the switching time between NR UL carrier and NR SUL carrier is 0 us.	
NOTE 2: For UE supporting SUL band combination simultaneous Rx/Tx capability is mandatory.	

(3GPP TS 38.101-1 V15.5.0 (2019-03), Table 5.2C-1.)

As shown in these examples, band 80 (non-limiting example of first frequency resource) supports uplink transmission only, while band 78 (non-limiting example of second frequency response) in TDD supports both uplink and downlink transmissions.

Claim 10	Public Documentation
[10b] a processor coupled to the quality status module and configured to:	<p>The Accused Instrumentalities comprise a processor coupled to the quality status module.</p> <p><i>See elements below.</i></p>
[10c] determine, based on the quality status of the first frequency spectrum resource, that the first frequency spectrum resource is a sub-optimal resource, for the uplink channel and the downlink channel, relative to other frequency spectrum resources that are available for use by the wireless base station; and	<p>The processor(s) in the Accused Instrumentalities are configured to determine, based on the quality status of the first frequency spectrum resource, that the first frequency spectrum resource is a sub-optimal resource, for the uplink channel and the downlink channel, relative to other frequency spectrum resources that are available for use by the wireless base station.</p> <p>For example, the preferred frequency is selected dynamically based on mobile reported measurements. Close to the base station, "second frequency resource" (TDD) is preferred and used for both uplink and downlink transmissions, and "first frequency resource" (SUL) is not used.</p> <p>One example of this determination is the handover mechanism to add/remove SUL component carriers (SCells).</p> <h3>B.1 Supplementary Uplink</h3> <p>To improve UL coverage for high frequency scenarios, SUL can be configured (see TS 38.101 [18]). With SUL, the UE is configured with 2 ULs for one DL of the same cell as depicted on Figure B.1-1 below:</p>  <p><b>Figure B.1-1: Example of Supplementary Uplink</b></p> <p>(3GPP TS 38.300 V2.0.0 (2017-12), § B.1).</p>

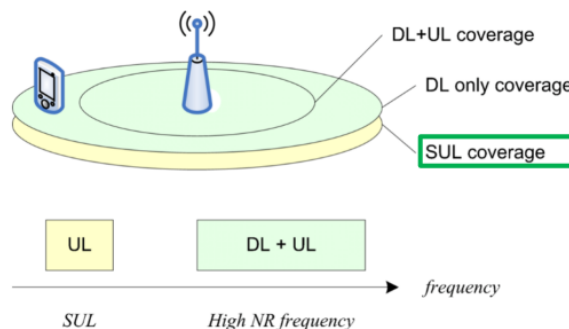
Claim 10	Public Documentation
<p>[10d] in response to the determination that the first frequency spectrum resource is the sub-optimal resource, assign the first frequency spectrum resource to a shared resource pool; and</p>	<p>The processor(s) in the Accused Instrumentalities are configured to in response to the determination that the first frequency spectrum resource is the sub-optimal resource, assign the first frequency spectrum resource to a shared resource pool.</p> <p>For example, the handover mechanism referred to previously is used to add/remove second component carrier (SCells). In HO, UE measurements are used to decide on the best serving cell, or carrier in CA. The same mechanism as CA is used for adding/removing SUL, as there is no other mechanism available or specified. Previously it was shown that gNB is responsible for making radio resource decisions. By default, all available frequency resources are in a “Shared Resource Pool.”</p>

Claim 10

Public Documentation

## B.1 Supplementary Uplink

To improve UL coverage for high frequency scenarios, SUL can be configured (see TS 38.101 [18]). With SUL, the UE is configured with 2 ULs for one DL of the same cell as depicted on Figure B.1-1 below:



**Figure B.1-1: Example of Supplementary Uplink**

(3GPP TS 38.300 V2.0.0 (2017-12), § B.1).

## 7.7 Carrier Aggregation

When CA is configured, the UE only has one RRC connection with the network. At RRC connection establishment/re-establishment/handover, one serving cell provides the NAS mobility information, and at RRC connection re-establishment/handover, one serving cell provides the security input. This cell is referred to as the Primary Cell (PCell). Depending on UE capabilities, Secondary Cells (SCells) can be configured to form together with the PCell a set of serving cells. The configured set of serving cells for a UE therefore always consists of one PCell and one or more SCells.

The reconfiguration, addition and removal of SCells can be performed by RRC. At intra-NR handover, RRC can also add, remove, or reconfigure SCells for usage with the target PCell. When adding a new SCell, dedicated RRC signalling is used for sending all required system information of the SCell i.e. while in connected mode, UEs need not acquire broadcast system information directly from the SCells.

(3GPP TS 38.300 V2.0.0 (2017-12), § 7.7).

Claim 10	Public Documentation
<p>[10e] a scheduler module coupled to the processor and configured to:</p>	<p>The Accused Instrumentalities comprise a scheduler module coupled to the processor.</p> <p>For example, the Accused Instrumentalities comprise a specific hardware or software structure corresponding to the claimed scheduler module. Information regarding the physical aspect of this structure is within the exclusive control of Defendant. This chart is made based on public documentation.</p> <p>For example, 3GPP documents specify base station messages for scheduling the frequency resource that is used.</p>

(3GPP TS 38.331 V15.5.1 (2019-04))

[10f] schedule the second frequency spectrum resource for the uplink channel or the downlink channel based on an initial directional allocation of frequency spectrum resources for the wireless base station;

The scheduler module(s) in the Accused Instrumentalities are configured to schedule the second frequency spectrum resource for the uplink channel or the downlink channel based on an initial directional allocation of frequency spectrum resources for the wireless base station.

For example, in general the second frequency resource can be scheduled for either uplink and downlink transmissions (irrespective of using the SUL).

B.1 Supplementary Uplink

To improve UL coverage for high frequency scenarios, SUL can be configured (see TS 38.101 [18]). With SUL, the UE is configured with 2 ULs for one DL of the same cell as depicted on Figure B.1-1 below:

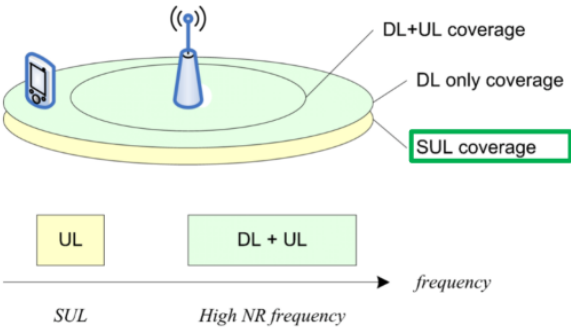


Figure B.1-1: Example of Supplementary Uplink

(3GPP TS 38.300 V2.0.0 (2017-12), § B.1).

Claim 10

Public Documentation

**Table 5.2-1: NR operating bands in FR1**

NR operating band	Uplink (UL) operating band BS receive / UE transmit <i>F<sub>UL,low</sub></i> – <i>F<sub>UL,high</sub></i>	Downlink (DL) operating band BS transmit / UE receive <i>F<sub>DL,low</sub></i> – <i>F<sub>DL,high</sub></i>	Duplex Mode
n1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
n2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
n3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
n5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
n7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
n8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
n12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
n20	832 MHz – 862 MHz	791 MHz – 821 MHz	FDD
n25	1850 MHz – 1915 MHz	1930 MHz – 1995 MHz	FDD
n28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
n34	2010 MHz – 2025 MHz	2010 MHz – 2025 MHz	TDD
n38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	TDD
n39	1880 MHz – 1920 MHz	1880 MHz – 1920 MHz	TDD
n40	2300 MHz – 2400 MHz	2300 MHz – 2400 MHz	TDD
n41	2496 MHz – 2690 MHz	2496 MHz – 2690 MHz	TDD
n50	1432 MHz – 1517 MHz	1432 MHz – 1517 MHz	TDD
n51	1427 MHz – 1432 MHz	1427 MHz – 1432 MHz	TDD
n65	1920 MHz – 2010 MHz	2110 MHz – 2200 MHz	FDD
n66	1710 MHz – 1780 MHz	2110 MHz – 2200 MHz	FDD
n70	1695 MHz – 1710 MHz	1995 MHz – 2020 MHz	FDD
n71	663 MHz – 698 MHz	617 MHz – 652 MHz	FDD
n74	1427 MHz – 1470 MHz	1475 MHz – 1518 MHz	FDD
n75	N/A	1432 MHz – 1517 MHz	SDL
n76	N/A	1427 MHz – 1432 MHz	SDL
n77	3300 MHz – 4200 MHz	3300 MHz – 4200 MHz	TDD
n78	3300 MHz – 3800 MHz	3300 MHz – 3800 MHz	TDD
n79	4400 MHz – 5000 MHz	4400 MHz – 5000 MHz	TDD
n80	1710 MHz – 1785 MHz	N/A	SUL
n81	880 MHz – 915 MHz	N/A	SUL
n82	832 MHz – 862 MHz	N/A	SUL
n83	703 MHz – 748 MHz	N/A	SUL
n84	1920 MHz – 1980 MHz	N/A	SUL
n86	1710 MHz – 1780 MHz	N/A	SUL

(3GPP TS 38.104 V15.5.0 (2019-03), Table 5.2-1). Here the non-limiting exemplary second frequency spectrum resource, band 78, is shown in red.

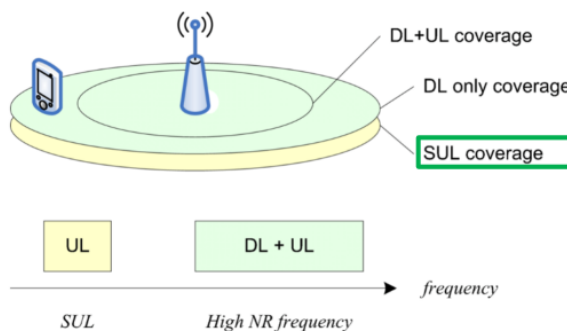
[10g] determine an updated directional allocation of frequency spectrum resources for the wireless base station after the second frequency spectrum resource is scheduled for the uplink channel or the downlink channel; and

The scheduler module(s) in the Accused Instrumentalities are configured to determine an updated directional allocation of frequency spectrum resources for the wireless base station after the second frequency spectrum resource is scheduled for the uplink channel or the downlink channel.

For example, in the case where SUL is used, the second frequency spectrum resource can be scheduled for the downlink channel. In the case where SUL is not used, the second frequency spectrum resource can be scheduled for either the uplink or the downlink channel.

## B.1 Supplementary Uplink

To improve UL coverage for high frequency scenarios, SUL can be configured (see TS 38.101 [18]). With SUL, the UE is configured with 2 ULs for one DL of the same cell as depicted on Figure B.1-1 below:



**Figure B.1-1: Example of Supplementary Uplink**

(3GPP TS 38.300 V2.0.0 (2017-12), § B.1).

+

**Table 5.2-1: NR operating bands in FR1**

NR operating band	Uplink (UL) operating band BS receive / UE transmit $F_{UL,low}$ – $F_{UL,high}$	Downlink (DL) operating band BS transmit / UE receive $F_{DL,low}$ – $F_{DL,high}$	Duplex Mode
n1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
n2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
n3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
n5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
n7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
n8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
n12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
n20	832 MHz – 862 MHz	791 MHz – 821 MHz	FDD
n25	1850 MHz – 1915 MHz	1930 MHz – 1995 MHz	FDD
n28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
n34	2010 MHz – 2025 MHz	2010 MHz – 2025 MHz	TDD
n38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	TDD
n39	1880 MHz – 1920 MHz	1880 MHz – 1920 MHz	TDD
n40	2300 MHz – 2400 MHz	2300 MHz – 2400 MHz	TDD
n41	2496 MHz – 2690 MHz	2496 MHz – 2690 MHz	TDD
n50	1432 MHz – 1517 MHz	1432 MHz – 1517 MHz	TDD
n51	1427 MHz – 1432 MHz	1427 MHz – 1432 MHz	TDD
n65	1920 MHz – 2010 MHz	2110 MHz – 2200 MHz	FDD
n66	1710 MHz – 1780 MHz	2110 MHz – 2200 MHz	FDD
n70	1695 MHz – 1710 MHz	1995 MHz – 2020 MHz	FDD
n71	663 MHz – 698 MHz	617 MHz – 652 MHz	FDD
n74	1427 MHz – 1470 MHz	1475 MHz – 1518 MHz	FDD
n75	N/A	1432 MHz – 1517 MHz	SDL
n76	N/A	1427 MHz – 1432 MHz	SDL
n77	3300 MHz – 4200 MHz	3300 MHz – 4200 MHz	TDD
n78	3300 MHz – 3800 MHz	3300 MHz – 3800 MHz	TDD
n79	4400 MHz – 5000 MHz	4400 MHz – 5000 MHz	TDD
n80	1710 MHz – 1785 MHz	N/A	SUL
n81	880 MHz – 915 MHz	N/A	SUL
n82	832 MHz – 862 MHz	N/A	SUL
n83	703 MHz – 748 MHz	N/A	SUL
n84	1920 MHz – 1980 MHz	N/A	SUL
n86	1710 MHz – 1780 MHz	N/A	SUL

(3GPP TS 38.104 V15.5.0 (2019-03), Table 5.2-1). Here the non-limiting exemplary second frequency spectrum resource, band 78, is shown in red.

Claim 10	Public Documentation
	<div data-bbox="533 233 1869 464"><b>5.4.2 Supplementary Uplink</b>  In conjunction with a UL/DL carrier pair (FDD band) or a bidirectional carrier (TDD band), a UE may be configured with additional, Supplementary Uplink (SUL). SUL differs from the aggregated uplink in that the UE may be scheduled to transmit either on the supplementary uplink or on the uplink of the carrier being supplemented, but not on both at the same time. (3GPP TS 38.300 V2.0.0 (2017-12), § 5.4.2)</div>

[10h] schedule the first frequency spectrum resource based on the updated directional allocation of frequency spectrum resources for the wireless base station.

The scheduler module(s) in the Accused Instrumentalities are configured to schedule the first frequency spectrum resource based on the updated directional allocation of frequency spectrum resources for the wireless base station.

For example, in the case where SUL is used based on scheduling, the first frequency spectrum resource is scheduled for uplink transmission.

B.1 Supplementary Uplink

To improve UL coverage for high frequency scenarios, SUL can be configured (see TS 38.101 [18]). With SUL, the UE is configured with 2 ULs for one DL of the same cell as depicted on Figure B.1-1 below:

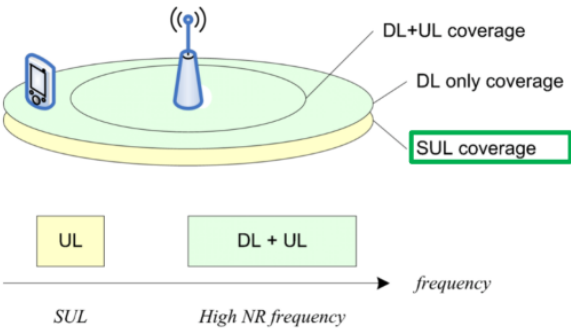


Figure B.1-1: Example of Supplementary Uplink

(3GPP TS 38.300 V2.0.0 (2017-12), § B.1).

+

**Table 5.2-1: NR operating bands in FR1**

NR operating band	Uplink (UL) operating band BS receive / UE transmit <i>F<sub>UL,low</sub></i> – <i>F<sub>UL,high</sub></i>	Downlink (DL) operating band BS transmit / UE receive <i>F<sub>DL,low</sub></i> – <i>F<sub>DL,high</sub></i>	Duplex Mode
n1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
n2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
n3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
n5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
n7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
n8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
n12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
n20	832 MHz – 862 MHz	791 MHz – 821 MHz	FDD
n25	1850 MHz – 1915 MHz	1930 MHz – 1995 MHz	FDD
n28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
n34	2010 MHz – 2025 MHz	2010 MHz – 2025 MHz	TDD
n38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	TDD
n39	1880 MHz – 1920 MHz	1880 MHz – 1920 MHz	TDD
n40	2300 MHz – 2400 MHz	2300 MHz – 2400 MHz	TDD
n41	2496 MHz – 2690 MHz	2496 MHz – 2690 MHz	TDD
n50	1432 MHz – 1517 MHz	1432 MHz – 1517 MHz	TDD
n51	1427 MHz – 1432 MHz	1427 MHz – 1432 MHz	TDD
n65	1920 MHz – 2010 MHz	2110 MHz – 2200 MHz	FDD
n66	1710 MHz – 1780 MHz	2110 MHz – 2200 MHz	FDD
n70	1695 MHz – 1710 MHz	1995 MHz – 2020 MHz	FDD
n71	663 MHz – 698 MHz	617 MHz – 652 MHz	FDD
n74	1427 MHz – 1470 MHz	1475 MHz – 1518 MHz	FDD
n75	N/A	1432 MHz – 1517 MHz	SDL
n76	N/A	1427 MHz – 1432 MHz	SDL
n77	3300 MHz – 4200 MHz	3300 MHz – 4200 MHz	TDD
n78	3300 MHz – 3800 MHz	3300 MHz – 3800 MHz	TDD
n79	4400 MHz – 5000 MHz	4400 MHz – 5000 MHz	TDD
n80	1710 MHz – 1785 MHz	N/A	SUL
n81	880 MHz – 915 MHz	N/A	SUL
n82	832 MHz – 862 MHz	N/A	SUL
n83	703 MHz – 748 MHz	N/A	SUL
n84	1920 MHz – 1980 MHz	N/A	SUL
n86	1710 MHz – 1780 MHz	N/A	SUL

(3GPP TS 38.104 V15.5.0 (2019-03), Table 5.2-1). Here the non-limiting exemplary first frequency spectrum resource, band 80, is shown in gold.

Claim 10	Public Documentation
	<p data-bbox="533 237 1075 280"><b>5.4.2 Supplementary Uplink</b></p> <p data-bbox="533 306 1864 431">In conjunction with a UL/DL carrier pair (FDD band) or a bidirectional carrier (TDD band), a UE may be configured with additional, Supplementary Uplink (SUL). SUL differs from the aggregated uplink in that the UE may be scheduled to transmit either on the supplementary uplink or on the uplink of the carrier being supplemented, but not on both at the same time.</p> <p data-bbox="533 435 1005 464">(3GPP TS 38.300 V2.0.0 (2017-12), § 5.4.2)</p>